WQB "Wide Aperture Quad" for Main Injector

20 January 2005
IB2 conference room
9:00 AM

Attendees: Bruce Brown, John Carson, Weiren Chou, TJ Gardner, Hank Glass, Dave Harding, Vladimir Kashikhin, Lucy Nobrega, John Zweibohmer

John Carson showed 3-D models of the magnet and major subassemblies. Quarter cores will be mated with potted coils and trim coils. Pairs of quarters will be aligned with keys and joined with welded tie plates. The half magnets will be assembled around the beam in the same fashion. The manifolding design is not done yet. The isolation will be done with PEEK®, either rigid or flexible tubing. The feet will match the existing Main Injector quad supports.

To allow adjustment of the end field, there is an insert in the end plate that can be machined to shape the field and can be shimmed in or out to change the effective length of the magnet based on measurements of the first article. The adjustment can not be done with the beam tube flange in place. Since the beam tube delivery has slipped from February to May, it will probably be best to measure and tune the first magnet without a beam tube, take it apart, and reassemble it in the final configuration.

23 of 50 magnet drawings are complete. All the individual part drawings for the coils and the ¼ cores are done and most parts are ordered. Many assembly drawings and parts such as brackets and manifolding remain to be done. 50 out of 57 tooling drawings are complete. Those that remain show the set-up of the tooling.

Many issues remain on the beam tubes. Is there a universal configuration of the ends that will allow storage of two identical spares identical to the seven installed magnets? Can we make a transition from the star tube to whatever is next in each direction that is smoother than a square corner? How much space is really there at each location? How will the BPM's be handled? Is there any use in ordering the beam tube a little long? Bruce, Lucy, and Weiren will meet later in the day to review each of the locations.

The beam tube vendor is Valley Metal of San Diego. The specified cleaning of the beam tube uses a substance that they recommended for our high vacuum application in place of our usual treatment. The permeability is specified as ≤ 1.10. This will be checked when the tubes arrive. The weld is to be on the end of a lobe, far from the beam but at the point of highest magnetic field.

Half of the main conductor is here, more is due next week, and the balance is due 15 February. The main winding fixture is due Friday or Monday. It will need to be inspected, then mounted. Winding should start about 1 February. The trim conductor is in hand. The tooling is due next week. The curing tooling is due 20 February.

The laminations are in hand. The stacking fixture is due 26 January. The plates, tie bars, and so forth are ordered or out for bids. As noted earlier, the beam tube delivery has slipped dramatically. Material Control will emphasize to the vendor our need for the tubes. A visit might be useful.

The current schedule, which does not reflect the beam tube slippage, shows the first magnet assembled 25 April, then spending four weeks at MTF. As a new magnet, especially with a second coil, it will take at least a week for the first measurements. We should budget at least a week for

each iteration of the end shape, two iterations if we are fortunate. We will then adjust the length. If we are actually doing this in May, we are likely to lose another week to absent physicists attending PAC05 in Knoxville. The test plan must be laid out carefully in advance. Plans should be made for measuring the trim coil. The current schedule completes the seventh magnet at the end of October 2005.

AD wants to install one magnet well before the 2005 shutdown. This could check the magnetic matching, explore the aperture in the NuMI region, test the installation procedure, and perhaps reduce the losses before they become unpleasant in the worst location. AD wants to install the balance of the seven magnets in the 2005 shutdown. The nominal (earliest) shutdown start date is 8 August. The shutdown is listed as eight weeks. Lucy wants to have the last magnet delivered at least two weeks before the end of the shutdown to allow time for installation and alignment. Needing time for magnetic measurements, fabrication must be complete before Labor Day.

TD will reexamine the schedule to see if any time can be squeezed out to improve the delivery dates.

Next meeting in two weeks: Thursday, 3 February 2005. Same time, same place.